THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte DAVID J. BOLL, KENNETH A. LOWE, WILLIAM T. McCARVILL and MICHAEL R. McCLOY

_____

Appeal No. 95-1806
Application No. 08/122,344[1]

_____

ON BRIEF

_____

Before KIMLIN, HANLON and PAK, Administrative Patent Judges.

HANLON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-11 and 14-21, all of the claims pending in the application. The claims on appeal are directed to a method of producing substantially cured fiber reinforced laminations.

[1] Application for patent filed September 15, 1993. According to the appellants, the application is a continuation of Application No. 07/739,115, filed July 31, 1991, now abandoned.

According to appellants, "[a]ll of the rejected claims stand together" (Brief, p. 3). Therefore, for purposes of this appeal, claims 2-11 and 14-21 stand or fall with the patentability of independent claim 1 which reads as follows:[2]

1. A method of producing substantially cured fiber reinforced lamination on a fiber placement system in situ while laying up at least one thermoset resin impregnated fiber tow or tape on a mandrel comprising the steps of:

a) passing the at least one thermoset resin impregnated fiber tow or tape through a preheating zone of the fiber placement system for preheating the thermoset resin impregnated fiber tow or tape to a predetermined temperature based on the particular thermoset resin in the range of from ambient to about 375˚C where the curing of the thermoset resin is partially advanced, and

b) laying up the partially advanced, preheated thermoset resin impregnated fiber tow or tape onto the mandrel while simultaneously advancing the curing of said thermoset resin to substantial completion of greater than 60% crosslink density by

i) supplying heat to the area of the mandrel proximate to where the thermoset resin impregnated fiber tow or tape is being placed thereon,

[2] The copy of claim 1 contained in the Appendix to the Brief contains the following errors: in line 1, "laminations" is plural; in line 1, "on a fiber placement system" has been omitted after the word "laminations"; "to" incorrectly appears before the word "through" in line 4; the word "system" has incorrectly been replaced with "apparatus" in line 15. A correct copy of claim 1 has been reproduced in this Decision on Appeal.

ii) monitoring a plurality of parameters characteristic of said fiber placement system or thermoset resin impregnated fiber tow or tape, and

iii) controlling the amount of advancement of cure of the resin in the thermoset resin impregnated fiber tow or tape as a function of the monitored values of said predetermined parameters.

The references relied upon by the examiner are:

Sherwood	3,313,670	Apr. 11, 1967
Chitwood et al. (Chitwood)	3,574,040	Apr. 6, 1971
Boss et al. (Boss)	3,844,822	Oct. 29, 1974
Wohrl (U.K. '793)	2,213,793A	Aug. 23, 1989

Since all of the rejected claims stand or fall with the patentability of independent claim 1, it is only necessary to decide whether claim 1 was properly rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boss, U.K. '793, Chitwood and Sherwood. We affirm this rejection based solely on the combination of Sherwood and Boss.

Discussion

Claim 1 recites a method of producing substantially cured fiber reinforced laminations on a fiber placement system in situ while laying up at least one thermoset resin impregnated tape on a mandrel comprising the steps of:

a) passing the thermoset resin impregnated fiber tape through a preheating zone of the fiber placement system for

preheating the thermoset resin impregnated fiber tape to a predetermined temperature where curing of the thermoset resin is partially advanced, and

b) laying up the partially advanced, preheated thermoset resin impregnated fiber tape onto the mandrel while simultaneously advancing the curing of the thermoset resin to substantial completion of greater than 60% crosslink density.

According to claim 1, curing of the thermoset resin to substantial completion of greater than 60% crosslink density is advanced by:

1) supplying heat to an area of the mandrel proximate to where the thermoset resin impregnated fiber tape is being placed thereon,

2) monitoring a plurality of parameters characteristic of the fiber placement system or thermoset resin impregnated fiber tape, and

3) controlling the amount of advancement of cure of the resin in the thermoset resin impregnated fiber tape as a function of the monitored values of the predetermined parameters.

Sherwood discloses a method for fabricating reinforced plastic articles from thermoset resin impregnated fiber tapes (col. 1, line 49-col. 2, line 3):

> The present invention is directed to an apparatus for winding a reinforced plastic pipe in which the temperature of the tape is sensed or measured as it passes from the distribution roller onto the mandrel. More specifically, the tape impregnated with a partially cured, solid resin, passes over a heat distribution roller and the heat from the roller serves to melt the resin. The tape then is wound onto the mandrel in a generally helical pattern. An infrared

> sensing unit, which measures infrared radiation, is directed toward the portion of the tape passing from the distribution roller to the mandrel and senses the temperature of the tape at that location. The infrared sensing unit is operably connected to the heating element of the distribution roller and as the temperature of the tape increases or decreases, the electrical energy supplied to the heating element of the distribution roller is correspondingly varied to provide a uniform tape temperature.
>
> The apparatus of the invention enables the tape and resin being wound on the mandrel to be at a constant temperature at all times and therefore provides a uniform product with substantially uniform physical properties.
>
> As the unit is responsive to the temperature of the tape as it is being wound on the mandrel, a uniform temperature will be maintained regardless of the speed variations of winding.

Sherwood recognizes that the partially cured thermoset resin may be heated as the tape is wound on the mandrel, either by passing the tape over a heated distribution roller or heating the mandrel itself (col. 1, lines 23-26).

According to Sherwood (col. 1, lines 33-41):

> [I]f the melted resin is applied to the mandrel at too low a temperature, the resin will not be fluid enough to completely squeeze the air out between the layers with the result that the air entrapment occurs between the wound layers. Conversely, if the resin is at too high a temperature, it will cure too quickly and cross-linking will not occur between the resin in superimposed layers so that a laminated structure may result.

Thus, Sherwood teaches that at the time the tape is wound onto the mandrel (1) heat is supplied to an area of the mandrel

proximate to where the thermoset resin impregnated fiber tape is placed thereon, (2) the temperature of the tape is monitored, and (3) the amount of heat supplied to the tape is controlled, thus controlling the temperature and cure of the tape. Therefore, curing of the thermoset resin in Sherwood is advanced to substantial completion within the meaning of appellants' claim 1 at the time the tape is wound onto the mandrel.

Sherwood further discloses that the tape is formed of a reinforcing material impregnated or coated with an uncured resin (col. 2, lines 62-63), and the resin is partially cured (col. 3, lines 18-27):

> The resin is applied to the reinforcing material in any conventional manner such as dipping, spraying, roller coating, and the like. After the resin and curing agent are applied to the reinforcing material, the resin will begin to cure or polymerize and the curing of the resin is halted at a predetermined stage by refrigerating the tape so that the resin will be in the solid partially cured state and will not be fully cured to the infusible state. The tape can then be wound in coiled form on reel 2 in preparation for the pipe fabricating process.

Sherwood does not disclose that curing of the resin impregnated fiber tape is partially advanced in a preheating zone. However, Boss discloses a process for partially curing a thermoset resin impregnated fiber ribbon in a heating zone (Abstract):

> The fibrous ribbon undergoing treatment is resin impregnated with a neat liquid resin system of relatively high viscosity containing an A-stage thermosetting resin through the application of a force sufficient to bring the resin into intimate association with the individual fibers of the ribbon. The resin impregnated ribbon is next partially cured while continuously passing through a heating zone as described while interposed between a pair of flexible endless belts.

The partially cured resin impregnated ribbon is separated from the flexible belts and may be directly utilized in the formation of reinforced composite structures by filament winding or other suitable techniques (col. 8, lines 52-55; Abstract).

Both Sherwood and Boss disclose that partially cured resin impregnated fiber reinforced ribbons or tapes are useful in a filament winding process. Furthermore, both Sherwood and Boss recognize that thermoset resins may be used to impregnate the reinforcing material. Therefore, it would have been obvious to one having ordinary skill in the art to partially advance the curing of a thermoset resin impregnated fiber tape in the winding process disclosed in Sherwood in a preheating zone as disclosed in Boss. Compare In re Fout, 675 F.2d 297, 301, 213 USPQ 532, 536 (CCPA 1982) ("Express suggestion to substitute one equivalent for another need not be present to render such substitution obvious.").

Appellants argue that the documents cited by the examiner fail to teach or suggest that the fiber tape is passed through a preheating zone "on a fiber placement machine" (Brief, p. 4). However, the claims do not require that the preheating zone be located on a fiber placement machine, rather the claims require that the preheating zone be part of a "fiber placement system." The term "fiber placement system" is broad enough to encompass a plurality of machines working together to perform a fiber placement operation. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow."). Limitations which are not in the claims cannot be read into the claims from the specification. In re Priest, 582 F.2d 33, 37, 199 USPQ 11, 15 (CCPA 1978) (citing In re Prater, 415 F.2d 1393, 1405, 162 USPQ 541, 551 (CCPA 1969)).

Appellants further argue that the infrared sensor employed in Sherwood does not monitor the tape after it is applied, but rather, monitors the tape prior to its application onto the pipe (Brief, p. 5). The examiner correctly points out that (Answer, p. 29):

> While it is true that Sherwood does not monitor the tape subsequent to application, note that the claims at hand do not recite monitoring the tape after application onto the surface, but rather recite that the heat is supplied to an area proximate to where the tape is to be placed and that this is what is monitored (see claims 3 and 4 of the appendix of appellants' brief). Certainly the area proximate the mandrel includes not only at the mandrel but just prior to the same. The claims are not commensurate in scope with appellants' argument.

Appellants have failed to establish otherwise.

Conclusion

For the reasons stated above, the decision of the examiner is affirmed. However, since our decision sets forth a new rational based on only two of the references cited in the final rejection, we denominate this affirmance as a new ground of rejection under 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides, "A new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

> (b) Appellants may file a single request for rehearing within two months from the date of the original decision . . . .

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed

rejection, including any timely request for reconsideration thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED; 37 CFR § 1.196(b)

EDWARD C. KIMLIN Administrative Patent Judge	)	
ADRIENE LEPIANE HANLON Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
CHUNG K. PAK Administrative Patent Judge	)	

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